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Differentiating this and eliminating the second derivatives,

$$x(1-x^2)^{\frac{1}{2}} \frac{dA}{dx} + (1-x^2) \frac{dB}{dx} = -2x.$$

Solving for $\frac{dA}{dx}$ and $\frac{dB}{dx}$,

$$\frac{dB}{dx} = -2x, \quad \frac{dA}{dx} = \frac{-2x^2}{(1-x^2)^{\frac{1}{2}}}.$$

Then $B = -x^2$, $A = \sin^{-1}x + x\sqrt{1-x^2}$.

The complete solution is then

$$y = (\sin^{-1}x - a)\sqrt{1-x^2} + (b-1)x,$$

a and b being arbitrary.

94. Proposed by ALOIS F. KOVARIK, Instructor in Mathematics and Science, Decorah Institute, Decorah, Iowa.

Find the minimum isosceles triangle that can be described about a given ellipse, having its base parallel to the major axis. [Ex. 16, page 166, *Rice and Johnson's Differential Calculus*.]

Solution by GEORGE E. DEAN, Professor of Mathematics, University of Missouri School of Mines and Metallurgy, Rolla, Mo.

The equation of the tangent to an ellipse in terms of the slope being

$$y = mx + \sqrt{a^2m^2 + b^2},$$

the altitude of the triangle will be the intercept of the tangent on the y -axis plus the semi-minor axis or $b + \sqrt{a^2m^2 + b^2}$.

The base of the triangle found by putting $y = -b$ in the equation of the tangent is

$$\frac{-b - \sqrt{a^2m^2 + b^2}}{m}.$$

The function of which a minimum value is to be found is accordingly

$$\frac{[b + \sqrt{a^2m^2 + b^2}]^2}{m}.$$

The derivative of this function equated to zero gives after reduction

$$a^4m^4 - 3a^2b^2m^2 = 0.$$

The value of m is $\pm b/a\sqrt{3}$, and $a^2m^2 + b^2 = 4b^2$.

The intercept on the y -axis is therefore $2b$, and the altitude of the triangle is $3b$.